



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-----------------------|------------------|
| 10/718,438 | 11/20/2003 | Wolfgang Rein | 9101.00005 | 9834 |
| 10534 | 7590 | 06/06/2005 | EXAMINER | |
| BLISS MCGLYNN, P.C. 2075 WEST BIG BEAVER ROAD SUITE 600 TROY, MI 48084 | | | MCMAHON, MARGUERITE J | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 3747 | |

DATE MAILED: 06/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

6

Office Action Summary

Application No.

10/718,438

Applicant(s)

REIN ET AL.

Examiner

Marguerite J. McMahon

Art Unit

3747

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4-8, 11-13, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP2-100821 in view of Hart et al (6,557,457). Note a piston 2, connecting rod 3, and a piston pin 1a having a smoothly profiled outer circumference that is substantially circular in cross section with a larger diameter at the distal ends than at the center portion, which tapers gradually from the distal ends to the center portion. JP2-100821 shows everything except the end of the connecting rod aligned with the piston bore including a phosphatized coating that is adapted to facilitate relative angular movement between the bore extending through the connecting rod and the outer circumference of the piston pin. Hart et al teach that it is old in the art to provide a phosphatized coating on at least one of the running surfaces of the wrist pin, connecting rod bore and piston pin bores (see abstract and column 2, lines 47-60). It would have been obvious to one having ordinary skill in the art to modify JP2-100821 by providing a phosphatized coating on the inside surface of the connecting rod bore and piston pin bore and/or the outside surface of the piston pin in lieu of a conventional bushing usually pressed into the connecting rod bore, **in order provide the necessary tribological properties therebetween, more simply and inexpensively.** In addition,

Hart et al show a slightly different range of thickness of phosphate coating than applicant's, i.e. applicant claims a range of 2 to 8 micrometers, and Hart et al show an overlapping range of 8 to 15 micrometers. According to MPEP 2144.05 (1), a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties.

Claims 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP2-100821 in view of Hart et al (6,557,457) as applied to claims 1, 2, 4-8, 11-13, 15, and 16 above, and further in view of Fangman (3,479,929). JP2-100821 in view of Hart et al show everything except employing a tapering connecting rod and bore housing. Fangman teaches that it is old in the art to provide a tapering connecting rod and bore housing. It would have been obvious to one having ordinary skill in the art to modify Loughlin in view of Hart by providing a tapering connecting rod and bore housing, **in order to reduce the mass of the rod, while maintaining surface area connection between piston and rod (see column 1, lines 19-25 of Fangman).**

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP2-100821 in view of Hart et al (6,557,457) as applied to claims 1, 2, 4-8, 11-13, 15, and 16 above, and further in view of DeBiasse (4,984,544). JP2-100821 in view of Hart teach everything except providing side relief channels along the inner circumference of the pin bore. DeBiasse teaches that it is old in the art to provide side relief channels 68 along the inner circumference of the pin bore. It would have been obvious to one having ordinary skill in the art to modify JP2-100821 in view of Hart et al by providing

side relief channels, **in order to accumulate lubricating oil to lubricate between the surfaces of the pin and bore.**

Claims 3, 9, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP2-100821 in view of Hart et al (6,557,457) as applied to claims 1, 2, 4-8, 11-13, 15, and 16 above, and further in view of Lindstrom (5,039,285). JP2-100821 in view of Hart et al show everything except an internal gallery between the first and second ends of the connecting rod to direct lubricant between said first and second ends. Lindstrom teaches that it is old in the art to provide an internal gallery 66 between first and second ends of the connecting rod 42 to direct lubricant between said first and second ends. It would have been obvious to one having ordinary skill in the art to modify JP2-100821 in view of Hart et al by employing an internal gallery in the connecting rod **to facilitate lubrication of the piston pin and crankshaft.**

Response to Arguments

Applicant's arguments filed 11/16/04 have been fully considered but they are not persuasive.

Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection. In particular, Applicant's remarks directed to the Loughlin reference are moot, as the Loughlin reference has been replaced with JP2-100821.

Applicant argues that the Hart et al (6,557,457) reference does not disclose or suggest the use of a profiled piston pin having an outer circumference that is substantially circular in cross-section with a larger diameter at the distal ends than at the

Art Unit: 3747

center portion for use in connection with a connecting rod including a phosphatized coating having a thickness between two and less than eight microns as required by claims 1 and 7, as amended. The examiner agrees with applicant that Hart et al does not show a piston pin with a larger diameter at the distal ends than at the center portion. However, Hart et al is not being relied upon to show this feature, as it is already shown by JP2-100821. Hart et al is relied upon to show a phosphatized coating. The phosphatized coating of Hart et al has "a depth or thickness of **about** 8.0 to 15 micrometers" (emphasis added, see column 3, lines 9-12 of Hart et al). Hart et al does not argue the importance of a thickness between 8.0 to 15.0 micrometers, as suggested by applicant. As noted in the above rejection, according to MPEP 2144.05 (1), a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. The examiner maintains that even though applicant has amended the claims by adjusting the range to 2 to less than 8 micrometers to avoid overlapping with the range suggested by Hart et al, that the depth or thickness of the coating could be adjusted to suit the application involved, such as, for instance utilizing a smaller coating with a smaller piston-engine or a larger coating with a larger piston-engine. Also, please note the citation of prior art in the first Office Action, which included the references of Uchara et al, which utilizes a thickness of phosphate coating of 2 to 8 micrometers (see abstract) and Kagohara et al, which utilizes a thickness of phosphate coating of 2 to 30 micrometers (see column 2, lines 50-60), as further

evidence that this particular coating depth does not provide a patentable distinction over the prior art.

Applicant further argues that the Lindstrom (5,039,285) reference does not disclose or suggest a piston pin having a profiled outer circumference that includes a phosphatized coating bonded thereto for use in connection with a connecting rod employed within an internal combustion engine as required by claim 18, and does not disclose or suggest a bushingless pivot surface between the piston pin and connecting rod of an internal combustion engine. The examiner agrees with applicant that Lindstrom does not show a piston pin with a phosphatized coating and does not mention a bushingless pivot surface between the pin and the connecting rod. However, Lindstrom is not being relied upon to show these features.

Applicant further argues that there is no motivation provided in any of the references to combine their teachings. The examiner has bolded the motivation to combine for each reference relied upon in the above rejection in order to draw Applicant's attention to them.

Applicant further argues that the Loughlin and Hart et al patents are diametrically opposed and would have to be reconstructed or rearranged to change their operations if they were to be combined. This argument will be responded to, as it is relevant to JP2-100821. The examiner is puzzled by this line of reasoning. JP2-100821 does utilize a bushing for the piston pin, as is conventional in the art, but does not rely upon the piston pin for patentability. The Hart et al reference teaches the advantage of utilizing a phosphatized coating as a means of eliminating the bushing and notes the following:

The coating absorbs and traps lubricating oil and develops a stiff lubricant squeeze film between the mating running surfaces of the connecting rod and wrist pin to provide the necessary tribological properties, eliminating the need for a conventional Cu-based bushing.

The invention has the further advantage of minimizing or eliminating the concern over bushing wear from increased levels of abrasive contaminants. The steel pins and connecting rods along with the coating are resistant to wear from such contaminants.

By eliminating the bushing, a cost savings is also recognized in both the material and labor of installation along with a reduction in the weight of the piston assembly.

So, as applicant can readily see, there is ample motivation to combine references.

Applicant further argues that the coating range of between two and less than eight microns is in contrast to the teachings of Hart et al because this range results in less vibration, engine noise or premature wear. The examiner still finds this reasoning unconvincing, as it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272,205 USPQ 215 (CCPA 1980).

Applicant further argues that the Lindstrom (5,039,285) reference teaches the use of three oil ports within a connecting rod, and that this bears no relation to the combination of a profiled piston pin and a bushingless connecting rod including a phosphatized coating. The examiner is uncertain as to the thrust of this argument, but will try to respond. The Lindstrom reference shows an engine having a piston with a piston pin and connecting rod and an internal gallery 66 between first and second ends

of the connecting rod 42 to direct lubricant between said first and second ends. It would have been obvious to one having ordinary skill in the art to modify JP2-100821 in view of Hart et al by employing an internal gallery in the connecting rod **to facilitate lubrication of the piston pin and crankshaft**. Again, it must be noted that Lindstrom is not being relied upon to show the shape of the piston pin and the phosphatized coating, which replaces the bushing in a conventional piston pin.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marguerite J. McMahon whose telephone number is 703-308-1956. The examiner can normally be reached on flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yuen Henry can be reached on 703-308-1946. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


MARGUERITE MCMAHON
PRIMARY EXAMINER